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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,785	07/25/2005	Linda Lefevre	Serie 6048	4802
Linda K Russell Air Liquide Intellectual Property Department Suite 1800 2700 Post Oak Boulevard Houston, TX 77056			EXAMINER YANG, JIE	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 06/30/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/511,785

Applicant(s)

LEFEVRE ET AL.

Examiner

JIE YANG

Art Unit

1793

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-22, 24-28 and 30-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-22, 24-28 and 30-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/11/2010 has been entered.

Status of the Previous Rejection

The previous rejections of claims 17, 20-22, 24, 25, 28, and 30-32 under 35 U.S.C. 103(a) have been withdrawn in view of the amendment filed on 6/11/2010. However, upon further consideration, a new ground(s) of rejection is made as following.

Status of the Claims

Claims 1-19, 23, and 29 have been cancelled; claims 30 and 31 have been amended; and claims 20-22, 24-28, and 30-32 are pending in application. Claims 30 and 31 are independent claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21, 22, 24-27, and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stratton et al (WO 02/44430, the corresponding US patent is US 7,147,732 B2, thereafter US'732) in view of Wandke (EP 0869189 machine translation, thereafter EP'189).

Regarding independent claims 30 and 31, US'732 teaches a quenching metallic object method using a compressed mixing gas (Abstract of US'732), which reads on the limitation of rapidly cooling metal parts using a pressurized cooling gas mixture as recited in the instant claims. US'732 teaches that the mixture of gas includes carbon monoxide or carbon dioxide (Col.2, lines 16-27 of US'732), which reads on the limitation of the gas mixture including one or plurality of infrared radiation absorbing gases as recited in the instant claims. US'732 teaches that the carbon monoxide or carbon dioxide is from 12 to 20Vol.% which is within the about 5 to about 80Vol.% as recited in the instant claim 31. US'732 further teaches including hydrogen in the mixture gas (Abstract and Col.2, lines 16-27 of US'732), which reads on the limitation of optionally adding additive gas selected from hydrogen, helium, or mixtures thereof as recited

in the instant claims. US'732 does not specify "consisting essentially of" the selected group of gases and US'732 teaches adding 40-60Vol% of N₂ in the mixing gas (claims 5 and 14 of US'732). EP'189 teaches a process for gas quenching metallic workpieces (title of EP'189). EP'189 teaches that the cooling helium, hydrogen, or mixture from helium and hydrogen mix with additional up to 30Vol.% inert gas (page 1, Description of EP'189). EP'189 further teaches that beside of applying the usual inert gases, such as nitrogen and argon, the gas with higher power consumption ability, such as carbon dioxide, hydrogen sulphide or water vapor can be applied. And particularly preferred for this carbon dioxide is used (Page 2, 3rd paragraph of EP'189). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the gas with higher power consumption ability instead of nitrogen, such as applying carbon dioxide or water vapor, as disclosed by EP'189 in the process of US'732 in order to obtain desired cooling result. See MPEP 2144.06. Because EP'189 teaches N₂ is an optional (up to 30vol%--description of EP'189), the mixing gas with helium, hydrogen, or mixture with a higher power consumption ability, such as carbon dioxide or water vapor taught by US'732 in view of EP'189 reads on the

"consisting essentially of" the selected group of gases as recited in the instant claims.

Still regarding claims 30 and 31, US'731 does not specify adjusting the composition of the mixture to obtain an average mixture density that is approximately same as that of nitrogen. However, US'731 in view of EP'189 teaches adjusting the similar gases (including hydrogen, helium, carbon monoxide or carbon dioxide, and water vapor) within the similar ranges (Col.2, lines 16-27 of US'732) for the same rapid cooling metallic object application (Col.1, lines 7-24 of US'732) as recited in the instant claims, therefore, it would be highly expected for the process of US'732 in view of EP'189 to obtain a gas mixture with an average mixture density being approximately same as that of nitrogen as claimed. MPEP 2112.01.

Regarding the limitation of convective heat transfer properties in claims 30 and 31, which fully depend on the composition of the mixture gas, US'731 in view of EP'189 teaches adjusting the similar gases (including hydrogen, helium, carbon monoxide or carbon dioxide, and water vapor) within the similar ranges (Col.2, lines 16-27 of US'732) for the same rapid cooling metallic object application (Col.1, lines 7-24 of US'732) as recited in the instant claims. The properties, such as convective heat transfer superior to those of nitrogen as

recited in the instant claims would be inherently met in the mixture gas of US'732. MPEP 2112 III&IV. This position is further evidenced by EP'189. EP'189 teaches that the mixed cooling gas increases the cooling rate 5-20% (page 1, 4th paragraph of Description of EP'189).

Regarding claims 21, 22, 24 and 25, US'732 teaches adding carbon dioxide in the mixture gas, which is recognized as an absorbing gas as recited in the instant claims 21 and 22. US'732 teaches that the carbon dioxide is from 12 to 20Vol.%, which is within the range of absorbing gas in claim 24 (5-100Vol.%) and overlaps the range of absorbing gas in claim 25 (20-80Vol.%).

Regarding claims 26 and 27, US'732 does not specify the limitation of the gas mixture comprising binary He/CO₂ (claim 26) or H₂/CO₂ (claim 27) mixture with the range of CO₂ in the mixture about 30Vol.% to about 80Vol.%. EP'189 teaches a process for gas quenching metallic workpieces (title of EP'189). EP'189 teaches that the cooling helium, hydrogen, or mixture from helium and hydrogen mix with additional up to 30Vol.% gas with higher power consumption ability, such as carbon dioxide (page 2, 2nd paragraph of EP'189), which overlap the range of CO₂ in the mixture about 30Vol.% to about 80Vol.% as recited in the instant claims. EP'189 further teaches that the mixture of the gas to be used in such a way the velocity and pressure being adjusted

(Abstract of EP'189). Therefore, it would have been obvious to one skilled in the art to have optimized the range of CO₂ in the mixture in the process of US'732 in view of EP'189 in order to obtain desired cooling result. See MPEP 2144.05 II.

Regarding claim 32, US'732 teaches H₂/CO₂ mixture gas with hydrogen 25-40Vol.% and carbon dioxide 12 to 20Vol.%, which reads on the limitation of the gas mixture comprising binary H₂/CO₂ mixture as recited in the instant claim. The range of carbon dioxide 12 to 20Vol.% taught by US'732 overlaps the range of CO₂ in the mixture about 20Vol.% to about 80Vol.% as recited in the instant claim.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over US'732 in view of EP'189 and Nakamura (JP 63149313, thereafter JP'313).

Regarding claim 20, US'732 in view of EP'189 does not specify gas stirring system in the vessel of cooling. JP'313 teaches a process of gas quenching in a closed vessel (Abstract of JP'313). JP'313 teaches blowing the cooling gas by a circulating fan (Abstract of US'313), which will stir the cooling gas as recited in the instant claim. Therefore, it would be obvious to one ordinary skilled in the art to apply a circulating fan as demonstrated by JP'313 in the process of

US'732 in order to enhance the cooling result (abstract of JP'313).

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over US'732 in view of EP'189 and Andersson (US 5,938,866, thereafter US'866).

US'732 in view of EP'189 does not specify the recycling process as recited in the instant claim. US'866 teaches a method for the treatment of components by a gas mixture (Abstract of US'866). US'866 teaches the recycling of a gas mixture, wherein the helium quenching gas and remnants of nitrogen gas from a previous heat treatment are compressed in a compressor and purified by purification and allowing for the recovery of nitrogen for subsequent use (Col.4, line 57 to Col.6, line 31 of US'866). Therefore, it would be obvious to one skilled in the art to apply a recycling process as demonstrated by US'866 in the process of US'732 in view of EP'189 in order to facilitate the recycling of a quenching gas thereby increasing the efficiency of the installation system (Col.1, lines 7-26 of US'866).

Response to Arguments

Applicant's arguments with respect to claims 20-22, 24-28, and 30-32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jie Yang/
JY